# THE MARINER'S
# everlasting Almanack

Wherein is set down diverse Motions of the *Moon*, with Rules and Tables for finding *Her Age* every day, and when *She* cometh to the *Meridian*, also the time of *Her* true Rising and Setting, fully examplified and proved.

Together with

*Everlasting Tyde-Tables, containing the true Ebbings and Flowings throughout the most part of the* Sea-Ports *and Towns in* Europe

As also

An excellent Table, shewing the exact Rising and Setting of the *Sun* for every five dayes, with the Degrees propper to the *Sun's* place.

And Lastly,

A pleasant Dialogue, containing some Orthographicall and Steriographicall Questions, with severall other usefull things; most necessary for the Good of this *NATION*, but more especially for the use of our gallant *Seamen*.

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*Calculated for the Latitude of* 57 *Degrees* 10 *minuts*.
By *Iohn Forbes* Printer to BON. ACCORD, & Φιλομαθ.

The second Edition, much Corrected and Enlarged.

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*ABERDEEN*,
Printed by the *Author*, Printer to the TOWN and UNIVERSITIE, *Anno* 1683.

# GOD SAVE KING CHARLES.

*Long may HE Live, and Reign, with all that RACE:*
*By Whom, we doe enjoy much Grace and Peace.*

---

*Apelles*, stairing long, did look upon
The Learning, Policy, and Generous Mind
Of that brave CITY, plac'd 'twixt DEE and DONE;
But how to Paint it, he could never find:
For still he stood, in judging which of Three,
A *Court*, a *Colledge*, or, a *Burgh*, it be.

*FLOREAT BON-ACCORDIA.*

TO

His worthy, and much reſpected Good Friend, Captain IOHN TYLER, at *Lieth*.

*SIR*,

HAving heard of your Fame, and of your induſtrious and vigilant Endeavours into the *Mathematicall rare Inventions*, (even in your younger years,) and eſpecially into that famous and noble *Art of Navigation*; and that from the mouth of a Credible Perſon, who was at that time a Teacher of the *Mathematicks* at *London*: have therefore made bold (tho unacquainted) to preſent You with a ſecond Edition of this *Enchiridion*, or, *ſmal Treatiſe*; to be sheltered under the Protection of Your Patrocinie: Whom, (I truſt) is able to de-

fend and aſsiſt me, in Truth and Veritie, againſt all malevolent and backbiting Oppoſers; who through their blind ignorance, doth falſly check us of Truths, and ſome ſmall overſights: as may be ſeen into the *Tyde-Table* of *Lieth*, Printed into an Almanack at *Edinburgh*, for this preſent year 1683: ſet forth by *James Paterſon Mathematician*. Wherefore, expecting your favourable Acceptance, of this ſmall *Embryo*, which shall ere long incourage me, to publish abroad a larger *Treatiſe*, on that excellent *Art of Navigation*, for the ſpeciall uſe of all our Loyal brave *Sea-men* and *Mariners*, whoſe painfull Labours tend much for the Good of this *Ancient KINGDOM*. Thus wishing You, and all the Worthie Fraternitie of Maſters of the Trinitie-houſe at *Lieth*, all happineſs here in this World, and Eternall Manſions of Joy in the World to come: I ever remain,

SIR,

Your humble Servant,
*Iohn Forbes*,
Printer to *BON-ACCORD*.

# An Introduction to the perpetuall *Tyde-Table*, or, *Table* of *Ebbing* and *Flowing*, in the moſt ſpeciall *Sea-Ports* in *Europe*.

THere are diverſe Motions of the *Moon*, being 15 in number; accounted by *Ricciolus*, in his *Almageſto Novo Aſtronomiæ*, *lib.* 4. *cap.* 18.

But here I intend to treat of thoſe Motions that are moſt uſefull for *Seamen* and *Mariners*, according as their daily practiſe doth require.

## SECTION I.

## The Firſt Motion of the Moon.

The firſt motion of the *Moon*, called the diurnall or daily motion, being the revolution of the *Moon* from the *Eaſt* to the *Weſt*, and from thence to the *Eaſt* in 24 *houres*; or rather almoſt in 25 *houres*: ſo that the *Moon* in this motion is ſloweſt of all the ſideriall Bodies, not following altogether the motion of *Primum Mobile* in 24 *houres*: For if the *Moon* be obſerved to be in Conju ction with any fixed Star this night the next night following, ſhe ſhall be found to be diſtant from the ſame 13 *degrees* 10 *minuts* 35 *ſeconds* to which in the *Æquator*, anſwereth to 52 *min* of time.

This motion, being her propper middle motion in longitude, performed under the *Zodiack*, becauſe as formerly I have mentioned ſhe performeth 13 *degrees* 10 *min*

10 *minuts* 35 *seconds* by her middle motion, which is betwixt the ſlow and the ſwift, and paſſeth through the *Zodiack*, in 27 *days*, 7 *hours*, 43 *minuts*: and this ſpace of time, is called the *Periodicall* moneth.

But becauſe the *Sun* moveth daily in the *Eccliptick*, 59 *min* 8 *ſec.* 20 *thirds*, towards the *Eaſt*, therefore the *Suns* motion being ſubſtracted from the middle motion of the *Moon* in *Longitude*, there ſhall remain the diſtance of the *Moon* from the *Sun*, 12 *degrees* 11 *minuts* 26 *ſeconds* 41 *thirds*.

## SECT. II.

## The Second Motion of the Moon.

The Synodicall moneth, or moneth of Conjunction, being longer then the periodical Moneth, becauſe the *Moon* being in Conjunction with the *Sun*, as admit, in the firſt of *Aries*, the *Moon* having preſcribed her motion through the *Zodiack* in 27 *dayes* 7 *hours* 43 *minuts*, doth not find the *Sun* in this point of the *Zodiack*, becauſe the *Sun* ſince the laſt Conjunction is paſſed towards the *Eaſt*; therefore that there may be a Conjunction of the *Sun* with the *Moon*, ſhe is to paſs a whole *Sign* almoſt, before ſhe can come to be in Conjunction with the *Sun*, and this is called, *Lunatio vera*. But if we have reſpect to the true motion, the ſpace of the middle *Lunation* being 29 *dayes* 12 *hours*, the longeſt 30 *dayes*, the ſhorteſt 28 *dayes* 23 *houres*: From hence it followeth, that 12 *Synodicall moneths* maketh a *Lunar year* to conſiſt of 354 *days*,

*days*, but the *Solar year* consisting of 365 *days* 5 *hours* 48 *minuts*, maketh the difference 11 *days*, being called the *Epact*: which is the difference betwixt the *Solar* and *Lunar Year*.

## SECT. III.
## The third Motion of the Moon.

The third motion is the motion of the *Nods*, of the circle of the *Moon*, contrare to the order of the *Signs*; for the *Orbite* of the *Moon*, is inclined to the plain of the *Eccliptick* by an Angle of 5 *degrees* in *New* and *full Moons*, or 5 *deg.* 18 *min.* in the quarters, which Latitude of 5 *degrees*, being the greatest, is called, the *Belly of the Dragon*, because of the similitude they have with a *Dragon* or *Serpent*, as is formed by the Peripherie of the *Lunar Eccliptick* with the Peripherie of the *Orbite* of the *Moon*, the one being called the *North*, and the other the *South*. The points wherein there is no Latitude, or where the *Orbite* of the way of the *Moon* cutteth the *Eccliptick*, being immediatly opposed, are called the *Nods*, whereof the one is called the *Nothern* and *ascendent*, because to us that are to the *North ward*, it is alwayes higher, ascending towards our Pole and Zenith, and therefore it is called *Caput Draconis* or, *head of the Dragon*, *marked thus* ☊ The other *Node* or *Intersection*, is called *Southern* descending, or, *the Taile of the Dragon*, *marked thus* ☋ These *Nods* or points of the intersection, near about which falleth out the Eclipses

of

of the *Sun* and *Moon*, are obſerved to move contrare to the Order of the *Signs*, the middle motion of the ſame being 3 *minuts* 10 *ſeconds* 38 *thirds* at neareſt, ſo that they will obſolve their period of motion through the *Eccliptick*, about 18 *years* 228 *days*, 3 *hours*, 50 *minuts*. But according to *Copernicus* in 18 *years*, 223 *days* 16 *hours*, 12 *minuts*. This motion by ſome was thought to be equall, but *Tycho* did find the ſame unequall, where you are here to obſerve that your *Golden Number*, is compoſed of this motion, being the ſpace of 19 *years* that the *Nods* do make their revolution in 19 *years*, and how to find the ſame. As alſo the *Epact*, whereby we may find the Age of the *Moon*.

## SECT. IV.
## How to find the Golden-Number.

AS alſo, to know at what time the *Moon* cometh to the *Meridian*, *Firſt*, find the *Golden-Number*, which is had by adding one to the Year of our Lord, and divyding the ſume by 19, the remainder that reſts over the diviſion ſhall be the *Golden-Number*; and the *Quotient* ſhall ſhow how many revolutions are paſt ſince the *head of the Dragon* was in the firſt of *Arries*. As ſuppoſe I deſire to know the *Golden Number* for the year 1683, to the which an *Unite* being added, the ſume is 1684: which divided by 19, the remainder is 12 for the *Golden-Number*, or 12 years are paſt ſince the *head of the Dragon* was in the firſt of *Aries*, and the moſt part of that year, the ſame wil-

will remain in *Leo*, and enters *Cancer* upon the 29 of *October*, having performed 88 Revolutions, as in the *Quotient* is evident.

## SECT. V.
## How to find the Epact.

HAving found the *Golden-Number*, the *Epact* may be easily had for this year, *viz.* 1683 by multiplying the *Golden-Number* by 11: (being the difference betwixt the *Solar* and *Lunar year*) the product is 132, which divided by 30 the *Quotient* is 4, and the remainder 12, which is the *Epact* for this year 1683: where you are to observe, that the *Golden-Number* beginneth alwayes the first of *January*, and the *Epact* the first of *March*.

## SECT. VI.
## How to find the Age of the Moon.

TO know the age of the *Moon*, add to the *Epact* of that year in which you desire the *Moons* age, the moneths from *March* inclusive, with the dayes of the moneth; and if the sume be less than 30, then the number is the age of the *Moon*, but if the sume of the addition exceed 30, from the same substract 30, if the moneth have 31 days, and if 30, substract 29, the remainder will be the age of the *Moon*: the reason of this substraction was to return back the 11 days, which was the difference between the *Solar* and *Lunar* year. *Example*, In the year 1683, I would

know the *Moons* age the 10 day of *Auguſt*, the moneth of *Auguſt* being the *6th*, and the *Epact* 12, the days of the moneth 10: theſe three { E M D / 12 6 10 } added together, the ſume is 28, which ſheweth the 28 of *Auguſt*, to be the 28 day of the *Moon*. And again, if you require the age of the *Moon* the 28 day of *Auguſt*, theſe { E M D / 12 6 28 } three numbers being added together, the ſume is 46, from which 30 being ſubſtracted (becauſe the moneth hath 31 days) the remainder is 16, ſo that the 28 of *Auguſt* 1683, is the 16 day of the *Moon*. This way being frequently uſed by *Sea-Men*, is not ſo exact as may be required; therefore I would adviſe *Sea-Men* to take notice of the Yearly *Almanacks*.

Having the age of the *Moon*, we may know at what time ſhe cometh to the *Meridian* by the precedent Rule, where the firſt day, or 24 hours after the *Conjunction* or *Change*, the *Moon* is 12 degrees diſtant from the *Sun*, in time 48 *min.* or 3 *quar.* 3 *min.* that the *Moon* cometh latter to the *Meridian* the firſt day; and ſo for every day to the *Oppoſition* or *Full-Moon*. Now to know at what time the *Moon* cometh to the *Meridian*, accept of this following *Table*, for this and another uſe, as ſhall follow.

This following *Table* containeth five *columns*, in the firſt and ſecond ye have the Increaſs and Decreaſs of the *Moons* age, as alſo, in the third and fourth, the *hours* and *minuts* that the *Moon* doth come to the

Meridian:

| The Moon's Age, In. ☽ | De. ☾ | ● Mooon coming to Meridian. Ho. | Min. | Moon's Age ☾ |
|---|---|---|---|---|
| 1 | 16 | 0 | 48 | 29 |
| 2 | 17 | 1 | 36 | 28 |
| 3 | 18 | 2 | 24 | 27 |
| 4 | 19 | 3 | 12 | 26 |
| 5 | 20 | 4 | 00 | 25 |
| 6 | 21 | 4 | 48 | 24 |
| 7 | 22 | 5 | 36 | 23 |
| 8 | 23 | 6 | 24 | 22 |
| 9 | 24 | 7 | 12 | 21 |
| 10 | 25 | 8 | 00 | 20 |
| 11 | 26 | 8 | 48 | 19 |
| 12 | 27 | 9 | 36 | 18 |
| 13 | 28 | 10 | 24 | 17 |
| 14 | 29 | 11 | 12 | 16 |
| 15 | 30 | 12 | 00 | 15 |

*Meridian*: for if the *Moon* be increasing (as you may see by the letters *In*, at the head of the first *column*) the *hours* and *minuts* against the same, is the time of the *Moons* coming to the *Meridian* in the afternoon. But if the *Moon* be decreasing, (as you may see at the head of the second *column*, by the letters *De.*) Then the *houres* and *minuts* sheweth the time of the *Moons* coming to the *Meridian* in the Morning.

*Example*

The 5 day and the 20 day of the *Moon*, I desire to know the *Moons* coming to the *Meridian*. I find for both these days 4 *hours*, showing that the 5 day, the *Moon* cometh to the *Meridian* at 4 *hours afternoon*, and the 20 day at 4 *hours* in the *morning*: the *columns* of *hours* and *minuts*, are had by multiplying the *Moons* age by 4, and divyding the product by 5, and if any remain over the division is the numerator of the

 fraction,

fraction, and for every *Unite* account 12 *minuts*, ſo you ſhall have the *hours* and *minuts* of the *Moon's* coming to the *Meridian*, as in the Table you may find. *As for Example*, the 7 day of the *Moon*, I deſire to know at what time in the afternoon ſhe cometh to the *Meridian*, ſo 7 multiplied by 4 the product is 28, which divyded by 5, the quotient is 5 *hours*, and 3 remaining over the diviſion giveth 36 *minuts*, ſo that the 7 day, the *Moon* cometh to the *Meridian* at 5 *hours*, 36 *minuts* in the afternoon.

*Some Examples.*

Having found by the Rules or Table the *Moons* coming to the *Meridian*, if there be any place where a *South Moon* maketh full-Sea as at the *Iſle of Wight*, I ſay that the 7 day of the *Moon* it will be Full-Sea, or high water at that place at 5 *hours*, 36 *minuts*. But if the *flowings* be to the *Eaſtward*, then you are to ſubſtract 3 quarters of an hour for every point of the *Compaſs*, and the remainder ſhall ſhow you the time of high water at that place. As alſo, I deſire to know the time of full-Sea the 7 day of the *Moon* at *Yarmouth* where a *South-South Eaſt Moon* maketh full-Sea: from 5 *hou.* 36 *min.* ſubſtract one *hou.* 30 *min.* the remainder is 4 *hou.* 6 *min.* at which time it will be full-Sea at *North-Yarmouth*. Again, if at *Lieth*, where a *South-Weſt by South Moon* maketh a full-Sea, you are to add 2 *hou.* 15 *min.* for 3 points of the *Compaſs* (becauſe *Weſtward flowings*) to 5 *hou.* 36 *min.* the ſume ſhall be 7 *hou.* 51 *min.* at which time it will be full-Sea at *Lieth*.

SECT.

## SECT. VII.

### How to find the ryſing and ſetting of the Moon.

LAſtly, to know at what hour the *Moon ſetteth* or *riſeth* for any day of her Age. for which purpoſe this ſmall treatiſe was intended You may accept of the ſecond uſe of this Table, in which, firſt you may know how long the *Moon* will ſhine or remain above the *Horizon*, from the *Conjunction* or *Change* to the *Full*, by knowing the *Moons* age in the firſt column and againſt the ſame, in the third and fourth columns you ſhall have the *hours* and *minuts* that the *Moon* doth ſhine or remain after the *Suns ſetting*, which being added to the ſetting of the *Sun*, giveth the ſetting of the *Moon*. *Example*, I deſire to know the 8 day of the *Moon* at what time ſhe will ſet, I find in the Table the 8 day of her age, and in the third and fourth 6 *hou.* 24 *min.* for ſo long will ſhe ſhine after the *Sun* ſetteth Then ſuppoſe the *Sun* to ſet at 5 *hours* in the *afternoon*, which being added to 6 *hou.* 24 *min.* the ſume ſhall ſhow the time of her ſetting, at 11 *hou.* 24 *min.* at night. For the *Moons* ryſing after the *oppoſition* or *full*, look for the *Moons* age in the ſecond column and the *hou.* and *min* anſwering, being ſubſtracted from 12 *hou.* giveth the *hou.* and *min.* that the *Moon* ryſeth before the *Sun*; which being ſubſtracted from the *Suns* ryſing, giveth the time of the *Moons* ryſing. *For Example*, The 17 day of the *Moon*, I find anſwering 1 *hour*, 36 *minuts*, which being ſubſtracted from 12 the remainder

emainder is 10 *hou.* 24 *min.* that the *Moon* will riſe efore the *Sun*, ſo that the *Moon* ſhineth 10 *hou.* 24 *nin.* in the morning before the *Sun* ryſe, and the *Sun* he ſame day ryſing at 7 *aclock*, 36 *min.* whereunto f I add 12 *hou.* elſe the ſubſtraction cannot be made, nd it maketh 19 *hou.* 36 *min*: from which 10 *hours* 4 *minuts* being ſubſtracted, there reſts 9 *hou.* 12 *min.* t which time the *Moon* ryſeth before midnight, but or ſaving a ſubſtraction, I have added the fifth co. umn, and againſt the dayes of the *Moons* age you ave the complement of the *hou.* and *min.* to 12, and o one ſubſtraction will ſerve. The reaſon of this able was had from *Plinius*, in his *lib.* 8. *cap.* 12; nd from others as is mentioned by *Ricciolus* in his *Aſtronomie*, *lib.* 4. *cap.* 4 *Prob.* 12. Which Rule al. hough not exact, yet may ſerve for vulgar uſe, for s the Learned *Kepler* doth obſerve concerning this ule of *Plinius*, that, *Medium inter ejus enormia tenet.*

A more exact and certain way may be had for the ime of ryſing and ſetting of the *Moon*: by knowing he place of the *Moon* in the Ecliptick, which being ad for the time you require the *Moons* ryſing and etting, you are to apply your ſelf to the laſt Table f the *Suns* ryſing and ſetting, and there finding the *ign* and *Degree* the *Moon* is into at the time required, r when the *Moon* cometh to the *Meridian*, by the rſt Table, with the *Signs* and *Degrees*: then looking or the *Suns* ſetting being in the ſame *ſigne* and *de.* *ree*, which being ſubſtracted from her coming to

the

the *Meridian*, giveth the time of the *Moons* ryſing: and being added giveth the time of her ſetting, all which ſhall be evident by the following Examples; for which purpoſe I have added a ſecond Table, ſhewing the *Moons* motion in *ſigns*, *degrees*, and *minuts*, for every *day* and *hour* of her Age.

Obſerving the 12 *Signs* with their marks; and reſpective moneths, the firſt 6 being N. *Northern* and the laſt S. *Southern*: alſo, there are 12 words in a verſe, for the 12 moneths, each of them beginning with a vowel, except the laſt, ( P. ) in *Paradice*, a conſonant being for *February*, and ſignifying the 8 day of *February* that the ☉ *Sun* will enter ♓ *Piſces*: for the reſt add the number of the beginning vowel of each word to 8, the ſume ſhall be the day of the moneth that the ☉ *Sun* entereth the reſpective *ſign*, as E in *Evil*, being the ſecond vowel, with 8 giveth 10 the day of *March* the *Sun* entereth ♈ *Aries*; as alſo, O, in *Objects* being the 4 vowel added to 8 is 12, ſhewing the *Sun* to enter ♋ *Cancer* the 12 of *Iune*, and ſo accordingly in all the reſt.

*The ſix Northern Signes.*

March, April, May, Iune, Iuly, Auguſt,
♈ Aries ♉ Taurus ♊ Gemini ♋ Cancer ♌ Leo ♍ Virgo,
2 *Evil* 1 *attends* 3 *its* 4 *object*, 5 *unvailed* 5 *vice*,

*The ſix Southern Signes.*

Septem. Octo. Novem. Decem. Ianuar Februar.
♎ Libra ♏ Scorpio ♐ Sagit. ♑ Capri. ♒ Aqua. ♓ Piſces.
5 *Vain* 5 *villans* 3 *jeſt*, 3 *into* 1 *A* 8 *Paradice*.

A

*A Table, shewing the Moon's Motion, in Signs, Degrees and Minuts, for every Day and Hour of her Age.*

## The Dayes of the Moon's Age.

| ● Age, | Si. | Deg. | Min. |
|---|---|---|---|
| 1 | 0 | 13 | 11 |
| 2 | 0 | 26 | 21 |
| 3 | 1 | 9 | 32 |
| 4 | 1 | 22 | 42 |
| 5 | 2 | 5 | 53 |
| 6 | 2 | 19 | 3 |
| 7 | 3 | 2 | 14 |
| 8 | 3 | 15 | 25 |
| 9 | 3 | 28 | 35 |
| 10 | 4 | 11 | 46 |
| 11 | 4 | 24 | 56 |
| 12 | 5 | 8 | 7 |
| 13 | 5 | 21 | 18 |
| 14 | 6 | 4 | 28 |
| 15 | 6 | 17 | 39 |
| 16 | 7 | 0 | 49 |
| 17 | 7 | 14 | 0 |
| 18 | 7 | 27 | 11 |
| 19 | 8 | 10 | 21 |
| 20 | 8 | 23 | 32 |
| 21 | 9 | 0 | 42 |
| 22 | 9 | 19 | 53 |
| 23 | 10 | 3 | 3 |
| 24 | 10 | 16 | 14 |
| 25 | 10 | 29 | 25 |
| 26 | 11 | 12 | 35 |
| 27 | 11 | 29 | 46 |
| 28 | 0 | 8 | 56 |
| 29 | 0 | 22 | 7 |
| 30 | | | |

## The Hours of the Moon's Age.

| Ho. | Deg. | Min. |
|---|---|---|
| 1 | 0 | 33 |
| 2 | 1 | 6 |
| 3 | 1 | 39 |
| 4 | 2 | 12 |
| 5 | 2 | 45 |
| 6 | 3 | 18 |
| 7 | 3 | 51 |
| 8 | 4 | 24 |
| 9 | 4 | 56 |
| 10 | 5 | 29 |
| 11 | 6 | 2 |
| 12 | 6 | 35 |
| 13 | 7 | 8 |
| 14 | 7 | 41 |
| 15 | 8 | 14 |
| 16 | 8 | 47 |
| 17 | 9 | 20 |
| 18 | 9 | 53 |
| 19 | 10 | 26 |
| 20 | 10 | 59 |
| 21 | 11 | 32 |
| 22 | 12 | 5 |
| 23 | 12 | 38 |
| 24 | 13 | 11 |

The uſe of this Table is as followeth, and firſt obſerving that the *Sun* and *Moon* are both in one *Signe* and *Degree* at the *Change* and *Conjunction* which you may have by your yearly *Almanack* or *Ephemeris*. As in the year 1683, I find the *Conjunction* or *Change* to be the 14 of *July* at 2 in the morning, (the *minuts* being omitted, as of no great concernment in this matter) then from 2 in the morning to 12 at midday, there are 10 hours, to the which anſwereth the hours of the *Moons* age, 5 *degrees*, 29 *minuts*, which being added to 1 *degree*, 3 *minuts* of *Leo*, the *ſigne* and *degree* the *Sun* and Moon was into at the change, the ſume is 6 *degrees*, 32 *minuts* and this is the place of the *Moon* the 14 of *July* at noone. But with more certainty by an *Ephemeris* into the 7 *deg.* of *Leo* the 14 day at noon. *Secondly*, I deſire to know the *Moons* place the 25 of *July*. ſo then between the 14 of *July*, and the 25 are 11 days inclusive, and in the table of the days of the *Moons* age, are 4 *ſignes* 25 *degrees*. *Laſtly*, ſeeing the Moon cometh to the *Meridian* the 11 day, at 8 *hours*, 48 *minuts*, to the which doth anſwere neareſt in the table of hours, 4 *degrees*, 56 *minuts*, theſe four being added together

| | S. | D. | M. |
|---|---|---|---|
| *Firſt the* ☽ *being in the* 1 *deg.* 3 *min of* ♌ *being* | 4 | 1 | 3. |
| *Secondly from* 2 *morning to noon, being* 10 *hours,* | 0 | 5 | 29 |
| *Thirdly the* 11 *day at noon,* - - - | 4 | 25 | 00 |
| *Laſtly for* 11 *days in the firſt table,* 8 *ho.* 48 *min. is* | 0 | 4 | 56 |
| *The ſume is* - - - - | 9 | 6 | 28 |

*And this much for the firſt way.*

These 9 *Signs* 6 *deg.* 28 *min.* showeth the *Moon* to be in the year 1683, *July* 25*th*, into the 6 *degree* 28 *minuts* of *Capricorn*: minuts being omitted in both, so the difference is but small; and no wonder that there be a difference: the *Ephemeris* by calculation being more exact then that which we can expect from this *Enchiridion*: where you are to observe, having found the place of the *Moon*, which if it had exceeded 12 *signes*, ye were then to substract 12, and the remainder counted from *Aries* inclusive, shall be the *Moons* place. But having found the same to be in the 7 *degree* of *Capricorn*, and the *Sun* in the same; by the last table of the *Suns* rysing and setting, ye shall find the *Sun* being in the 7 *degree* of *Capricorn* to set in the *Latitude* of 57 *deg.* 10 *min.* at 3 *hou* 15 *min.* which being added to 8 *hou* 48. *min.* the *Moons* coming to the *Meridian*, showeth the setting of the *Moon*, to be at 12 *hou.* 3 *min.* about midnight; and being substracted from 8 *hou.* 48 *min.* the remainder is 5 *hou.* 33 *min.* for the rysing of the *Moon* in the afternoon. And accordingly you may know the rysing and setting for any other day of her age, either increasing or decreasing. Upon these grounds an Instrument may be made for performing of the same without Tables. *And this much for the second way.*

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*The Third Way.*

In the same year 1683, *December* 17 being the 10 day

10 day of the *Moon*, and coming to the *Meridian* at 8 aclock in the afternoon: I find the *Moon* to be in 23 *degrees* of *Aries*, having 5 *degrees* 16 *minuts South-Latitude*; which being ſubſtracted from 8 *degrees*, 58 *minuts* (the *Suns Declination* being in 23 of *Aries*,) is 3 *degrees* 42 *minuts*, which may be called the *Moons Declination*, or diſtance from the *Equinoctiall Northerly*, though not propperly, becauſe the *Latitude* of the *Moon* or *Star*, is ſaid to be an Arch of a great Circle, contained between the body of the *Moon* or *Star*, and the *Eccliptick* paſſing by the *Eccliptick Poles*: and the *Declination* an Arch of a great Circle, contained between the body of *Sun*, *Moon*, or *Star*; and the *Equinoctiall* paſſing by the Poles of the World. But the difference between the two Arches being ſmall and of no great conſequence to this matter, we look in the tables of Declination for 3 *deg.* 42 *min.* in ♈ *Aries*, in which *ſign* and *degree* the *Sun* being, ſetteth about 6 *hou.* 10 *min.* which added to 8 *hou.* the *Moons* coming to the *Meridian* the ſume is 14 *hou.* 10 *min.* or 2 *hou.* 10 *min.* in the morning the *Moon* will ſet, and being ſubſtracted from 8 *hou.* the remainder 1 *hou.* 50 *min.* for her ryſing afternoon. Now by the ſecond way wherein there is no reſpect had to the *Latitude* of the *Moon*, we find the *Sun* being in 23 *deg.* of *Aries* to have his half ſemidiurnall Arch 6 *hou.* 56 *min.* which being added to 8 *hou.* the *Moons* coming to the *Meridian* giveth 14 *hou.* 56 *min.* for her ſetting,

and ſubſtracted from 8 *hou.* giveth 1 *hou.* 4 *min.* this being an error ought to be ſeriouſly conſidered, as not being tollorable, the half *Semidiurnall Arch* only being 6 *hou.* 10 *min.* and not 6 *hou.* 56 *min.* by conſidering the *Latitude* Having formerly made mention, that the *Moons* Latitude being added or ſubſtracted from the *Moons* true *Declination* of *Longitude*, the difference is of no great conſequence, as I ſhall illuſtrate in theſe following caſes, ſuppoſing the *Moons Longitude* to be in the 15 *degree* of *Taurus*.

## SECT. VIII.

*A deſcription of the following Spherical Triangle.*

Let there be an *Oblique Spherical Triangle*, as A, B, C, projected in the plain of the *Soliſtitiall-Colure*, either *Orthographice*, according to *Ptolomies Analemma*, or *Steriographice*, according to *Gemma Frisius* his *Aſtrolob*: the *Arch* A, B, ſhall repreſent the diſtance between the two *Poles*, to wit, of the *Diurnall* and *Annuall Motion*, being 23 *deg.* 30 *min.* B, C, an *Arch* of the *Co. Latitude* of the *Moon*, and A, C, of the *Co. Declination*. *Dat.* A, B, the Angle

Angle at B, and B, C, to find A, C, or Complement; being the Declination of the *Moon*.

| | ☾ *Lat.* *Deg.* | ☾ *Decl.* *deg. min.* | *Decl. 15 added* *deg. min.* | *Diff* *min* |
|---|---|---|---|---|
| NORTH. | 5 | 21 8 | 21 24 | 16 |
| | 4 | 20 11 | 20 24 | 13 |
| | 3 | 19 14 | 19 24 | 10 |
| | 2 | 18 16 | 18 24 | 8 |
| | 1 | 17 19 | 17 24 | 5 |

| | ☾ *Lat.* *Deg.* | ☾ *Decl.* *deg. min.* | *Substracted* *deg. min.* | *Diff* *min* |
|---|---|---|---|---|
| SOUTH. | 5 | 11 35 | 16 24 | 11 |
| | 4 | 12 32 | 16 24 | 8 |
| | 3 | 13 30 | 16 24 | 6 |
| | 2 | 14 27 | 16 24 | 3 |
| | 1 | 15 24 | 16 24 | 0 |

These two Tables I have composed; for showing of the difference between the *Moons Declination*, (being had by the resolution of the former *Triangle*,) and the place of the *Moon* in the *Eccliptick*; having either *N.* or *S. Latitude*. *As for Example*, I have taken the *Moons Longitude* to be in the 15 *deg.* of *Taurus*, whose *Declination* is 16 *deg.* 24 *min* In the first table there are 5 columns, *First*, the *Moons Latitude* to 5 *deg.* of *N. Latitude*. *Secondly*, the *Moons Declination*. *Thirdly*, the *Declination* of the 15 *deg.* of *Taurus* being 16 *deg.* 24 *min.* added to 5 *deg.* of *N. Latitude*, giveth 21 *deg.* 24 *min.* the difference from the *Moons*

*Declination* 21 *deg.* 8 *min.* being only 16 *min.* and that for the fifth column, and ſo accordingly in all the reſt. The ſecond table, where the *Moon* hath *South Latitude*, the *Moon* being in the ſame degree of the Eccliptick, according to her *Longitude*, ye have in the firſt column as formerly, the *Moons Latitude S.* *Secondly*, the *Moons Declination*: and *thirdly*, the *Declination* of 15 *deg of Taurus*, from which if ye ſubſtract the *Moons Latitude*, the remainder ſhall be 11 *deg.* 24 *min* differing from the *Moons Declination* 11 *min.* What I have ſaid here concerning *N.* or *S. Latitude*, in the *Nothern Signs*, may be applyed to *N.* or *S.* *Latitude* in *Southern Signs.* But if it be required, when the *Declination* with the *Latitude* added, is more then 23 *deg.* 30 *min.* as I ſuppoſe the ☽ *Moon* to be in the 25 *deg.* of *Gemini*; having *Declination* 23 *deg* 26 *min. North*, and the *Latitude* 5 *deg.* 16 *min.* *North*, the ſume is 28 *deg.* 26 *min*: now to know the 20 day of the *Moon*, at what time the *Moon* ryſeth and ſetteth. Having found the *Declination* of the ☽ *Moon* by what formerly hath been ſaid, to be 28 *deg.* 40 *min*, with the *Poles Elevation* 57 *deg.* 10 *min.* we may find the difference aſſentionall to be 57 *deg.* 55 *min*, in time 3 *hou* 52 *min*; which added to 6 *hou.* the ſume is 9 *hou.* 52 *min.* added to 4 *hou.* in the morning, the *Moons* coming to the ☽ *Meridian*, giveth 13 *hou.* 52 *min.* or, 52 *min.* paſt 1 *hou.* afternoon; and ſubſtracted from 4, leaveth 6 *hou* 8 *min.* at which time the *Moon* will riſe the former day in the

the afternoon. As for the *Horizontall refraction* and *Parallax*, being of no great concernment in this matter to handle any further, I desist. *Lastly*, I would advise *Seamen*, that are versed in the principles of *Navigation*, as in the *Sphere* and *Globs*, to furnish themselves with *Ephimerides*, either *Argol*, or *John Gadbury* their *Ephimerides*, which will continue these 28 years; wherein they may have the true place of the *Luminaries*, with the *Moons Latitude*, for the *Meridian* or 12 acloak each day.

## SECT. IX.

*A declaration, for the better understanding of these Everlasting Tables, for the Ebbs and Floods following.*

IF you be desirous at any time to know when it is a full-Sea, or high water at any *Port* or *Haven* either in *Scotland*, *England*, *France* or *Ireland*, or any other part of the World: If first by your own knowledge, or the knowledge of any expert *Mariner*, you know, when you see the *Moon* in such a part of the *Firmament*, that then it is ful-Sea at such a *Port* or *Haven*, then these Tables shall be needless for you: But if you cannot so do, and would learn, then resort to this Table: And first consider with your self, how many days old the *Moon* is, the day that you desire to know the Tyde: And in the middle of this Table you shall find in the uppermost part thereof; this tittle, *The Age of the Moon*: and right against the day of

of the Age of the *Moon*, you ſhall find on both ſides, the places and points of the *Firmament*, as *South*, *South by Weſt*; *South South-Weſt*, &c. And next under that Line, are theſe letters, *Ho.* and *Min.* which ſignifieth *Hours* and *Minuts*: Then having in memorie the Age of the *Moon*, as aforeſaid, go directly to the tittle of that place of the *Firmament*, to the which when the *Moon* cometh, maketh a high Water, and there you ſhall find the exact *Hour* and *Minut* when it is ful-Sea in that place,

*As for Example.*

*Where it flowes* South *by* Weſt, *as at* Aberdeen, *I deſire to know at what time it will be full-Sea at that place, the* 10 *day of the Moon: I apply my ſelf to the Table, and I find the flowing at* Aberdeen, South *by* Weſt, *then looking in the Column of the Age of the Moon, I find the day of the Moon* 10, *and right againſt the ſame upon the left hand I find* 8 *hours* 45 *minuts: at which time in the Evening it will be full-Sea at that place: but if it be the* 25 *day of the Moon, you ſhall find the ſame flowing to be at* 8 *hours* 45 *minuts in the morning.*

*Another Example,*

*Where it flowes* South-Weſt *by* South, *as at* Lieth, *I deſire to know at what time it will be full-Sea at that place, the ſaid* 10 *day of the Moon: I apply my ſelf to the Table, and I find the flowing at* Lieth, South-Weſt *by* South: *then looking in the Column of the Age of the Moon, I find the day of the Moon* 10, *and right againſt the ſame upon the right hand I find* 10 *hours* 15 *minuts: at which time in the Evening it will be full-Sea at that place: but if it be the* 25 *day of the Moon, you ſhall find the ſame flowing to be at* 10 *hours* 15 *minuts in the morning and accordingly throughout theſe following Everlaſting Tyde-Tables.*

| at Buchāneſs, and all the South-ſide of the Murray-Firth, Cromarty, Millorchy, Inverneſs, Findorne, Spey, Bamff, Peterhead, Iſle of Wight, at Deal, at Dover-Peer, on the Coaſt of Flanders, &c. | at Newbrugh Aberdeen, Stonhyve, Redbane, at Fluſhing, within the Maes, at Maldon, at the VVeſt-end of the Nower, at Blacktail, at Rocheſter, at VVinchelſey, and within Terveer, &c. | The Age of the Moon. | at Montroſe, the out-end of Fay, St. Andrews, Cryle, Enſter, and all along the Coaſt of Fiſſe to Brunt Iſland, before Gaurie and at Graves-end, under Holy-Iſland, and at Horn, &c. | at Lieth in the Firth, at Dundee, Brunt Iſland, Holy-Iſland, St. Lucas, without Bluet at Denby, without Fount-nay, at Liſbon, before the VVeilings, &c. |
|---|---|---|---|---|
| South. | S. *by* W. | ☽ | S. S. W. | S. W. *by* S. |
| North. | N. *by* E. | | N. N. E. | N. E. *by* N. |
| *Ho. Min.* | *Ho. Min.* | *In. De.* | *Ho. Min.* | *Ho. Min.* |
| 12 48 | 1 33 | 1 16 | 2 18 | 3 3 |
| 1 36 | 2 21 | 2 17 | 3 6 | 3 51 |
| 2 24 | 3 9 | 3 18 | 3 54 | 4 39 |
| 3 12 | 3 57 | 4 19 | 4 42 | 5 27 |
| 4 0 | 4 45 | 5 20 | 5 30 | 6 15 |
| 4 48 | 5 33 | 6 21 | 6 18 | 7 3 |
| 5 36 | 6 21 | 7 22 | 7 6 | 7 51 |
| 6 24 | 7 9 | 8 23 | 7 54 | 8 39 |
| 7 12 | 7 57 | 9 24 | 8 42 | 9 27 |
| 8 0 | 8 45 | 10 25 | 9 30 | 10 15 |
| 8 48 | 9 33 | 11 26 | 10 18 | 11 3 |
| 9 36 | 10 21 | 12 27 | 11 6 | 11 51 |
| 10 24 | 11 9 | 13 28 | 11 54 | 12 39 |
| 11 12 | 11 57 | 14 29 | 12 42 | 1 27 |
| 12 0 | 12 45 | 15 30 | 1 30 | 2 15 |

| at Ennerkything, Queensferrie, st. Margarets-Hoop, Borrowstonneſs, Lyme-Kills, & all above Inchgarvie, except Stirling-Bridge, at LONDON and before Newcaſtle, at Amſterdā, & Armentiers, &c. | from Buchanneſs, and all alongſt the Coaſt without, above the May, or Highland in the South-Firth, and from Flambrough-head, to Firding tonBay without, Oſtend, at Breſt, before the Baſs &c. | The Age of the Moon. | A little off the Shore before Humber between Bridlington, and Lowerneſs, at Lands-end of Golph, from Oſtend to St Catharins, at Aberwark, in the Bree ſound: Baltimore, Mouſehole, Dungarvan, &c. | at Arbroth, Falmouth, between Silly and Lizard, in Milford, Moonleſs, St. Maloes, at Caldy, and in the Bay of Canarvan, at the mouth of Severn, Foy, Humber New-Caſtle, Garnſey, and Wales, &c. |
|---|---|---|---|---|
| S. W. N. E. | S.W by W. N.E by E. | ☽ ☾ | W. S. W. E N. E. | W. by S. E. by N. |
| Ho. Min. | Ho. Min. | In. De. | Ho. Min. | Ho. Min. |
| 3 48 | 4 33 | 1 16 | 5 18 | 6 3 |
| 4 36 | 5 21 | 2 17 | 6 6 | 6 51 |
| 5 24 | 6 9 | 3 18 | 6 54 | 7 39 |
| 6 12 | 6 57 | 4 19 | 7 42 | 8 27 |
| 7 0 | 7 45 | 5 20 | 8 30 | 9 15 |
| 7 48 | 8 33 | 6 21 | 9 18 | 10 3 |
| 8 36 | 9 21 | 7 22 | 10 6 | 10 51 |
| 9 24 | 10 9 | 8 23 | 10 54 | 11 39 |
| 10 12 | 10 57 | 9 24 | 11 42 | 12 27 |
| 11 0 | 11 45 | 10 25 | 12 30 | 1 15 |
| 11 48 | 12 33 | 11 26 | 1 18 | 2 3 |
| 12 36 | 1 21 | 12 27 | 2 6 | 2 51 |
| 1 24 | 2 9 | 13 28 | 2 54 | 3 39 |
| 2 12 | 2 57 | 14 29 | 3 42 | 4 27 |
| 3 0 | 3 45 | 15 30 | 4 30 | 5 15 |

At Lin half-tyde, Weighmouth, Wells, and Waterford, Hull, Londey, at Holms, Briſtol, Concallo, at Abermorick, and Antwerp, before Hambrough, and the Teſſel, &c.

between Foy and Falmouth and at Briſtol-Key, and Weighmouth-Key, at Lime, Foul-neſs, at Sedmouth, and at the Start. before St. Nicholas, & Podeſſinsk in Ruſſia, &c.

The Age of the Moon.

Bridgewater, at the Fly, before the Coaſt of Friſland, Ex water, at the Lizard by the Land, at Cape Cleer in the Road of the Teſſell, and off the Start in the Channell. &c.

at Yarmouth, the Hague, between Beachy and the Iſle of Wight and alſo in St. Magnes Sound, and at Machnells Caſtle, at Dublin, at Lambey, Peter-port, without the Fly, &c.

| East. | E. by S. | ☽ ☾ | E. S. E. | S. E. by E. |
|---|---|---|---|---|
| West. | W. by N. | | W. N. W. | N. W by W. |
| Ho. Min. | Ho. Min. | In. De. | Ho Min. | Ho. Min. |
| 6 48 | 7 33 | 1 16 | 8 18 | 9 3 |
| 7 36 | 8 21 | 2 17 | 9 6 | 9 51 |
| 8 24 | 9 9 | 3 18 | 9 54 | 10 39 |
| 9 12 | 9 57 | 4 19 | 10 42 | 11 27 |
| 10 0 | 10 45 | 5 20 | 11 30 | 12 15 |
| 10 48 | 11 33 | 6 21 | 12 18 | 1 3 |
| 11 36 | 12 21 | 7 22 | 1 6 | 1 51 |
| 12 24 | 1 9 | 8 23 | 1 54 | 2 39 |
| 1 12 | 1 57 | 9 24 | 2 42 | 3 27 |
| 2 0 | 2 45 | 10 25 | 3 30 | 4 15 |
| 2 48 | 3 33 | 11 26 | 4 18 | 5 3 |
| 3 36 | 4 21 | 12 27 | 5 6 | 5 51 |
| 4 24 | 5 9 | 13 28 | 5 54 | 6 39 |
| 5 12 | 5 57 | 14 29 | 6 42 | 7 27 |
| 6 0 | 6 45 | 15 30 | 7 30 | 8 15 |

at Penthland-firth, at Kirkwa, at Elwick, at the Mullhead at Catenes, at Orkney, at Dumbar, at the Bass Island, at Kildren, at the Isle of Man, at Harlem, and at Home-head, &c.

at Alborough at the Caskets, and at Chamberness, at Dungeness, and Dunnose, thwart of Garnsey in the Channel, at Ley-staff, and thwart of it without the Banks, at Orfordness, at Sheram, at Tergow, at Deep. &c.

The Age of the Moon.

in the Week of Catenes, Bulleyn-deep at Cows, in Calice Road, at Dover, and in the Downs at Harwich, without the Banks of Harwich, at St. Helens, all the Coast of Normandy and Picardy, in Yarmouth-Road, &c.

before the Haven of Caven, in the Chamber, between Cripple-sand and the Creyl, and at Culsbot, in fair Isle-Rhoads, and at the North-fore land, in the Chamber, and Gor-end, at Harwich within, at Rye, &c.

| S. E. N. W. | S. E *by* S. N W. *by* N. | ☽ ☾ | S. S E. N. N. W. | S. *by* E. N. *by* W. |
|---|---|---|---|---|
| *Ho. Min.* | *Ho. Min.* | *In. De.* | *Ho. Min.* | *Ho. Min.* |
| 9 48 | 10 33 | 1 16 | 11 8 | 12 3 |
| 10 36 | 11 21 | 2 17 | 12 6 | 12 51 |
| 11 24 | 12 9 | 3 18 | 12 54 | 1 39 |
| 12 12 | 12 57 | 4 19 | 1 42 | 2 27 |
| 1 0 | 1 45 | 5 20 | 2 30 | 3 15 |
| 1 48 | 2 33 | 6 21 | 3 18 | 4 3 |
| 2 36 | 3 21 | 7 22 | 4 6 | 4 51 |
| 3 24 | 4 9 | 8 23 | 4 54 | 5 39 |
| 4 12 | 4 57 | 9 24 | 5 42 | 6 27 |
| 5 0 | 5 45 | 10 25 | 6 30 | 7 15 |
| 5 48 | 6 33 | 11 26 | 7 18 | 8 3 |
| 6 36 | 7 21 | 12 27 | 8 6 | 8 51 |
| 7 24 | 8 9 | 13 28 | 8 54 | 9 39 |
| 8 12 | 8 57 | 14 29 | 9 42 | 10 27 |
| 9 0 | 9 45 | 15 30 | 10 30 | 11 15 |

A full and compleat Everlaſting Tyde-Table, for all the *Sea-Coaſts* and *Harbours* of *Great Brittain*, *France* and *Ireland*, *Holland*, *Spain*, *Flanders*, *Norway*. *Biſcay*, *&c.* Shewing exactly what *Moon* maketh a full-Sea, in all the aforeſaid places, or into any other place of the World; according to theſe foregoing Everlaſting Tyde-Tables, of the Ebbings and Flowings, Hours and Minuts of the *Moons* daily Age: becauſe that all could not be contained into the ſaid foregoing Tables. The like never heretofore by any, ſo fully publiſhed.

South and North Moon, maketh a full-Sea, at *Buchanneſs*, and all along the South-ſide of the *Murray-Firth*, (viz) *Cromarty*, *Millorchy*, *Inverneſs*, *Findorne*, *Spey*: alſo *Bauff*, *Peterhead*, *Iſle of Wight*, at *Deal*, at *Beachy*, and before the *Race* of *Blanquet*, in the *Condado*, at *Dover-Peer*, and before *Dunkirk*, at *Emden*, before the *Elve*, before the *Eyder*, and before *Enckuſen*, on the Coaſt of *Flanders*, in the Road of *Gibralter*, at *Graveling* and before *Gherbrough*, before the *Hever*, before *Horn*, and at *Hampton-Key*, at *Jutland*-Iſlands, *Kentiſh Knock*, at *Liegh*, and at *Newport* half Tyde, at *Portſmouth* half Tyde, at *Quinbrough*, in the *Sleeve*, between *Uſhant* and *Silly*, at the *Shooe*, at the *Spits*, at *South-Hampton*, and all along the *Swin*, before *Vreck*

S. by W. or, N. by E. Moon, at *New-burgh*, ABERDEEN, *Stonhyve*, *Redbane*, at *Blacktail*, and thwart of *Beachy* in the *Offing*, in the Camber of *Rie*, at *Fluſhing* within the *Maes*, and at *Maldon*, at the Weſt end of the *Nower*, at *Rocheſter*, within *Terveer*, at *Winckelſey*. S. S. W.

S. S. W. or, N. N. E. Moon, at *Montroſe*, the out end of *Tay*, *St. Andrews*, *Cryle*, *Euſter*, and all along the Coaſt of *Fiffe* to *Brunt-Iſland*, at *Army*, at *Black-neſs* in *Bluet*, at *Bell-Iſle*, at *Baraike*, without *Calice*, at *Corpus-Chriſti* point, before *Camfer*, and at *Camfer*, at *Edam*, before the *Fen* in the Channel, before *Gourie*, and at *Graves-end*, under *Holy-Iſland*, and at *Horn*, before the *Maes*, at *Ramkins*, before *Terveer*, before the River of *Thames*, and at *Tinmouth*, at the *Weilings*, and from the Weſt end of the *Weight*, before *Yarmouth*, on the Coaſt of *Zealand*, at *Fern-head*.

S. W. by S. or, N. E. by N. Moon, at LIETH in the *Firth*, *Dundee*, *Brunt-Iſland*, *Holy-Iſland*, *Lucas*, without *Bluet*, at *Denby*, without *Fountnay*, at *Liſbon*, before the *Weilings*.

S. W. or, N. E. Moon, at *Ennerkything*, *Queens-ferrie*, *St. Margarets-hoop*, *Borrowſtonneſs*, *Lyme-Kills*, and all above *Inchgarvie*, except *Stirling-Bridge*, at LONDON, and before *Newcaſtle*, at *Amſterdam*, and *Armentiers*, the River of *Bourdeaux*, the South Coaſt of *Britaign*, the Coaſt of *Biſcay*, at *Beckneſs*, between *Calice* and *Dover*, before *Conquet*, and at the *North-Cape*, at *Dort*, without the Banks of *Flanders*, at *Groy*, at *Gaſcoign*, and the Coaſt of *Gallicia*, before *Hartlepool*, on the Weſt Coaſt of *Ireland*, *Killiars*, and before the River of *Nantz*, at *Orkneſs*, at the *Penns*, *Porthus*, and *Picton*, at *Roterdam*, in *Robin-Hoods Bay*, and from the Race to the *Pole-head*, upon the Coaſt of *Spain*, and in *Shotland*, before the *Tees*, and before the Bay of *Tinmouth*, at *Uſe*, and in the *Zierick-Sea*.

S. W. by W. or, N. E. by E. Moon, from *Buchanneſs*, and all alongſt the Coaſt without, above the *May*, or *Highland* in the *South-Firth*, and from *Flambrough-head*, to *Birdlington-Bay* without, *Oſtend*, at *Breſt* before the *Baſs*, the River of *Bourdeaux* within the Haven, and at *Berwick*, at *Huntelif-foot*, at the *Maes*, and before St. *Mathews*

*Mathews Point*, on the Coaſt of *Portugall*, at *Roven*, and before *Rochel*, at *Silly*, and in the *Sound*, at *Staples*, between *Uſhant* and the *Main*.

W. S. W. or, E. N. E. Moon, A little off the Shore before *Humber*, between *Bridlington* and *Lower-neſs*, at *Lands-end* of *Golph*, from *Oſtend* to *St. Catharines*, at *Aberwark*, in the *Bree-ſound*, *Bloy*, *Baltimore*, at *Cork*, at *Calice*, and in the *Creek*, at *Dungarvan*, at *Flambrough*, and *Bridlington*, at *Kingſale*, in *Mouſehole*, at *Mathews*, and within *Mounts Bay*, at the Clefts of the *Texel*, in the *Vourd*, at the Bay within *Uſhant*, in the Sea of *Wales*, and *Severn*, at *Tough-Hall*, before *Scarbrough*, at *Seven-Iſles*, without the Haven in the Broad *Sound*, at *Lawrens*, in *Cork*-Haven.

W. by S. or, E. by N. Moon, at *Arbroth*, at *Caldy*, and in the Bay of *Canarvan*, at the *Fourn*, in *Foy*, at *Falmouth*, at *Garnſey*, at *Humber*, in all the Havens on the South Coaſt of *Ireland*, thwart of *Loudey*, and before *Line*, in *Milford*, at *Moonleſs*, at *St. Maloes*, at *New-Caſtle*, in *Plimouth*, and before *St. Pauls*, in *Ramſey*, at the mouth of *Severn*, between *Silly* and the *Lizard*, at the *Spurn*, in *Wales*, at *Merles*, and all along the Coaſt of *Briſtol*.

E. or W. Moon, at *Abermorick*, and *Antwerp*, before *Bremen*, and at *Blackney*, in the Channel before *Bourdeaux*, and at *Briſtol*, at *Concallo*, at *Dartmouth*, before *Hambrough*, at *Hull*, at the *Holms*, and before *Humbers* mouth, at *Lin* half tyde, at *Londey*, at *St Pauls* in the Haven, without *Silly*, in the Channel, and at *Salcomb*, in *Torbay*, and before the *Teſſell*, without *Uſhant*, at *Wells*, at *Weighmouth*, and at *Waterford*, and *St. Davids-head*.

E. by S or, W. by N. Moon, at *Briſtol-Key*, between *Foy* and *Falmouth*. in the Channel, and at *Foulneſs*, at *Lime*, before *St. Nicolas*, before *Todeſſinik*, in *Ruſſia*, at

*Sedmouth*,

Sedmouth, and at the Start, at Weighmouth-Key.

E. S, E. or, W. N. W. Moon, at Bridgwater, at Cape Cleer, before the Coast of Friezland, and the Fly, at Kilduyn, at the Lizard by the Land, between Muſehole and Falmouth, and in Milford Haven, thwart of Plimouth, Off the Start in the Channel, in the Road of the Texel, at the Neſs by Wieringben, and at Winterton, at Exwater, at Lands-end.

S. E. by E. or, N. W. by W. Moon, between Beachy and the Iſle of Wight, without the Caſkets in the Channel, at Dublin, without the Fly, at Lambey, in St. Magnes Sound, at Machnells Caſtle, at the Needles, at Iſle of Wight, thwart of the Iſle of Wight in the Channel, all within the Iſle of Wight, between the Iſle of Wight and Beachy by the Shore, at Yarmouth, at Peter-Port, at Harflew, at the Hague.

S. E. or, N. W. Moon, at Penthland-Firth, at Kirkwa, at Elwick, at the Mull-head, at Catneſs, at Orkney, the Baſs-Iſland, at Dumbar, at Kildren, at the Iſle of Man, between Garnſey and the Caſkets, before Cromer, before the Caſket, and Garnſey, at Seven-Clifts, before the Eaſtern and Weſtern Emes, and at Egmont, at Frieze, and Fair-Iſles, between Garnſey and Caſkets, at Harlem, and at Homehead, at Kildave, at the Race of Portland, within the Seyn, before Schelbagh, and at Seven Cliffs, at the Eaſt end of the Weight, and on Wieringen-Flats, at Pool, at Farro-head in the Channel, between Farro head, and the Mull of Kintire

S. E. by S. or, N W. by N. Moon, at Alborough, at the Caſkets, and at Chamberneſs, at Dungeneſs, and Dunneſe, thwart of Garnſey in the Channel, at Leyſtaff, and thwart of it without the Banks, at Orford-neß, at Shoram, at Tergow, at Deep.

S. S. E. or, N. N. W. Moon, Bulleyn deep, at Cows, in the Foſs of Caen, in Calice Road, and in Chamberneſs-Road,

Road, at *Dover*, and in the *Downs*, in the *Freith*, and at the *South-Foreland*, at St. *Helens*, at *Harwich*, and without the Banks of *Harwich*, in *Leyſtaff* Road, and at *Longſand-head*, all the Coaſt of *Normandy*, and *Picardy*, at *Orfordneſs* without the Banks, and between *Orford* and *Orwell-Waves*, at *Seyn-head*, in *Yarmouth* Road, and in *Yarmouth*-Haven, at *Braſſie-Sound*, at St. *Johns-Deluce*, at *Caleſtoun*, and at *Scrabſter*.

S, by E. or, N. by W. *Moon*, before the Haven of *Caven*, in the *Chamber*, between *Cripple* Sand and the *Creyl*, and at *Culſhot*, in *Fair-Iſle* Roads, and at the *North-Foreland*, in the *Chamber*, and *Gore-end*, at *Harwich* within, before *Margate*, between the *Naze* and *Warhead* of *Lower*, at *Orfordneſs* within the Sands, at *Rye*, and into *Thames-Roads*, at *Calſhot*.

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A Table, ſhewing the exact Riſing and Setting of the *Sun*, for every five dayes of each Moneth, with the *Degrees* of the twelve *Signs* propper to the *Suns-Place*; for the *Lat.* of 57 *degrees*.

## *IANUARY.*

| *Sun's Place* | *Days of the Moneth.* | *The Sun riſeth,* | *The Sun ſetteth.* |
|---|---|---|---|
| 22 ♑ | 1 | 8 Hours 32 Min | 3 Hours 28 Min |
| 26 " | 5 | 8 Hours 24 Min. | 3 Hours 36 Min |
| 1 ♒ | 10 | 8 Hours 18 Min | 3 Hours 42 Min |
| 6 | 15 | 8 Hours 6 Min. | 3 Hours 54 Min |
| 11 | 20 | 7 Hours 55 Min. | 4 Hours 5 Min |
| 16 | 25 | 7 Hours 46 Min. | 4 Hours 14 Min |

| Sun's Place | Days of the Moneth | The Sun riseth. | The Sun setteth. |
|---|---|---|---|
| 22 ♒ | 1 | 7 Hours 29 Min | 4 Hours 31 Min. |
| 27 | 5 | 7 Hours 20 Min | 4 Hours 40 Min. |
| 2 ♓ | 10 | 7 Hours 8 Min | 4 Hours 52 Min. |
| 7 | 15 | 6 Hours 54 Min. | 5 Hours 6 Min. |
| 12 | 20 | 6 Hours 44 Min. | 5 Hours 16 Min. |
| 17 | 25 | 6 Hours 31 Min. | 5 Hours 29 Min. |

## MARCH.

| Sun's Place | Days of the Moneth. | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 21 ♓ | 1 | 6 Hours 22 Min. | 5 Hours 38 Min. |
| 25 | 5 | 6 Hours 12 Min. | 5 Hours 48 Min. |
| 1 ♈ | 10 | 6 Hours 0 Min. | 6 Hours 0 Min. |
| 5 | 15 | 5 Hours 48 Min. | 6 Hours 12 Min. |
| 10 | 20 | 5 Hours 36 Min. | 6 Hours 24 Min. |
| 15 | 25 | 5 Hours 23 Min. | 6 Hours 37 Min. |

## APRIL,

| Sun's Place | Days of the Moneth. | The Sun riseth | The Sun setteth. |
|---|---|---|---|
| 22 ♈ | 1 | 5 Hours 7 Min. | 6 Hours 53 Min. |
| 26 | 5 | 5 Hours 0 Min. | 7 Hours 0 Min. |
| 1 ♉ | 10 | 4 Hours 47 Min. | 7 Hours 13 Min. |
| 5 | 15 | 4 Hours 35 Min, | 7 Hours 25 Min. |
| 10 | 20 | 4 Hours 26 Min. | 7 Hours 34 Min. |
| 15 | 25 | 4 Hours 12 Min. | 7 Hours 48 Min. |

## MAY.

| Sun's Place | Days of the Moneth. | The Suns riseth. | The Sun setteth. |
|---|---|---|---|
| 21 ♉ | 1 | 4 Hours 0 Min. | 8 Hours 0 Min. |
| 25 | 5 | 3 Hours 52 Min. | 8 Hours 8 Min. |
| 30 | 10 | 3 Hours 42 Min. | 8 Hours 18 Min. |
| 4 ♊ | 15 | 3 Hours 36 Min | 8 Hours 24 Min. |
| 6 | 20 | 3 Hours 27 Min. | 8 Hours 33 Min. |
| 14 | 25 | 3 Hours 20 Min. | 8 Hours 40 Min. |

| Sun's Place | Days of the Moneth | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 21 ♊ | 1 | 3 Hours 15 Min. | 8 Hours 45 Min. |
| 24 | 5 | 3 Hours 13 Min. | 8 Hours 47 Min. |
| 27 | 10 | 3 Hours 12 Min | 8 Hours 48 Min. |
| 4 ♋ | 15 | 3 Hours 12 Min. | 8 Hours 48 Min. |
| 9 | 20 | 3 Hours 15 Min. | 8 Hours 45 Min. |
| 13 | 25 | 3 Hours 16 Min. | 8 Hours 42 Min. |

JULY.

| Sun's Place | Days of the Moneth | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 19 ♋ | 1 | 3 Hours 25 Min. | 8 Hours 35 Min. |
| 23 | 5 | 3 Hours 34 Min. | 8 Hours 26 Min. |
| 28 | 10 | 3 Hours 38 Min | 8 Hours 22 Min. |
| 2 ♌ | 15 | 3 Hours 47 Min, | 8 Hours 13 Min. |
| 7 | 20 | 3 Hours 56 Min, | 8 Hours 4 Min. |
| 12 | 25 | 4 Hours 6 Min. | 7 Hours 54 Min. |

AUGUST.

| Sun's Place | Days of the Moneth | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 19 ♌ | 1 | 4 Hours 21 Min. | 7 Hours 39 Min. |
| 23 | 5 | 4 Hours 33 Min. | 7 Hours 29 Min. |
| 27 | 10 | 4 Hours 40 Min | 7 Hours 20 Min. |
| 2 ♍ | 15 | 4 Hours 52 Min. | 7 Hours 8 Min. |
| 7 | 20 | 5 Hours 3 Min | 6 Hours 57 Min. |
| 12 | 25 | 5 Hours 16 Min. | 6 Hours 44 Min. |

SEPTEMBER,

| Sun's Place | Days of the Moneth | The Sun riseth. | The Sun setteth. |
|---|---|---|---|
| 9 ♍ | 1 | 5 Hours 33 Min. | 6 Hours 27 Min. |
| 23 | 5 | 5 Hours 43 Min. | 6 Hours 17 Min. |
| 27 | 10 | 5 Hours 55 Min. | 6 Hours 5 Min. |
| 2 ♎ | 15 | 6 Hours 4 Min | 5 Hours 56 Min. |
| 7 | 20 | 6 Hours 17 Min. | 5 Hours 43 Min. |
| 12 | 25 | 6 Hours 29 Min. | 5 Hours 31 Min. |

| Sun's Place | Days of the Moneth. | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 18 ♎ | 1 | 6 Hours 44 Min. | 5 Hours 16 Min. |
| 22 | 5 | 6 Hours 53 Min. | 5 Hours 7 Min. |
| 27 | 10 | 7 Hours 6 Min. | 4 Hours 54 Min. |
| 2 ♏ | 15 | 7 Hours 15 Min. | 4 Hours 45 Min. |
| 7 | 20 | 7 Hours 29 Min. | 4 Hours 31 Min. |
| 12 | 25 | 7 Hours 41 Min. | 4 Hours 19 Min. |

## NOVEMBER.

| Sun's Place | Days of the Moneth. | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 19 ♏ | 1 | 7 Ho. 56 Min. | 4 Ho. 4 Min. |
| 23 | 5 | 8 Ho. 4 Min. | 3 Ho. 56 Min. |
| 28 | 10 | 8 Ho. 10 Min. | 3 Ho. 50 Min. |
| 3 ♐ | 15 | 8 Ho. 23 Min. | 3 Ho. 37 Min. |
| 9 | 20 | 8 Ho. 33 Min | 3 Ho. 27 Min. |
| 14 | 25 | 8 Ho. 39 Min | 3 Ho. 21 Min. |

## DECEMBER,

| Sun's Place | Days of the Moneth. | The Sun riseth, | The Sun setteth. |
|---|---|---|---|
| 20 ♐ | 1 | 8 Ho. 4 Min. | 3 Ho 8 Min. |
| 24 | 5 | 8 Ho. 47 Min | 3 Ho. 13 Min. |
| 29 | 10 | 8 Ho. 48 Min. | 3 Ho. 12 Min. |
| 1 ♑ | 15 | 8 Ho. 48 Min | 3 Ho. 12 Min. |
| 9 | 20 | 8 Ho. 45 Min. | 3 Ho. 15 Min. |
| 14 | 25 | 8 Ho. 41 Min. | 3 Ho. 19 Min. |

*Thus* Courteous Reader, *ſo much here is done,*
*Which may pleaſe all, ſave* Paterſon *alone;*
*Therefore to Our* Dialogue, *let's proceed,*
*In which I hope to clear my ſelf indeed.*

# A Mathematicall Dialogue, BETWIXT *Iames Paterſon* Mathematician at *Edinburgh*, And *Iohn Forbes* Printer to *Aberdeen*, & φιλομαθ.

(Paterſon.) *I charge the* Printer *with ſeverall Errors in his* Almanack, *ſet forth and printed by him for the Year* 1683. *And firſt, concerning the* Eclipſe *which did fall out upon the* 17 *day of* Ianuar *in the afternoon, wherein he is deficient in giving the* Digits Eclipſed; *as alſo, in reference to the tyme of the* Eclipſe duration.

(*Printer.*) *Courteous Reader*, I confeſs, being about my ſerious Imployments in the Printing Preſs, I could not have leaſure to Calculate that *Eclipſe*, but made uſe of ſeveral *Ephimerides*; as *Vincent Wing*, and *Samuel Morland*, *&c.* And *Argolus* doth aſſert the *Digits Eclipſed* to be 10 and more, *Iohn Gadbury* 9: *Paterſon* 8 *dig.* 13 *min.* as for the time, *Iohn Gadbury* ſayeth, the middle will be at 3 *hou.* afternoon, the end at 4 *hou.* 3 *min*, or after the going down of the *Sun*: for in the *Latitude* of 57 *degrees* 10 *minuts*, being for *Aberdeen*, the *Sun* ſeteth being in the 8 *degree* of *Aquarius*, at 3 *hou.* 57 *min.* but *Paterſon* ſayeth 10 *min.* before 4 *hou.* at *Aberdeen*, which is near half an hour; (a Prodigie which was never ſeen, the *Sun* to ſet at 3 *hou.* 30 *min.* at *Aberdeen*!) but by reaſon of the refraction, the *Sun* may appear or ſhow himſelf above the *Horizon*, when he is not, If ſo the parallax be leſſer then the refraction; and ſo I may truely and warrantably ſay, the *Sun* doth ſet at *Aberdeen*, the 17 day of *Januar*, at 4 *hou.* 18 *min.* afternoon. But granting I be

redundant in ſome *Minuts*, but not ſo groſly, and as to ſay, not ſo deficient as he is. In ſaying the *Sun* being in the 8 *degree* of *Aquarius*, ſeteth at 3 *hou.* 30 *min.* but in trueth, at 3 *hou* 57 *min.* But what doth this concern me? My *Antagoniſt* cannot ſay, there is any wrong done to the *Vulgar*, or *Horaſcopographier*. But, as for that *Eclipſe* which by an *Teleſcope* of 6 foot long, I did obſerve at the ſeting of the *Sun*, and did not find above two *digits* of the *Suns* body obſcured, with no apparent darkneſs, or ſhaddow of change by that *Eclipſe*: it was (as we all ſay,) to *Weſt-ward* Inhabitants. But laſtly, I ſhall lay down ſome certain things to be obſerved in going about this *Eclipſe*, and ſome things I ſhall demand of this *Mathematician*, in which I hope he will ſatisfie me, except he be, *Mathematicus nomine tenus*, (as I ſuppoſe) for I ſhall be as Laconick as I can, intending not to trouble the *Reader* with frivolous Expreſſions. *Firſt*, ſuppoſing the middle tyme of the *Eclipſe* to be at 3 aclock in the afternoon, according to *Iohn Gadbury*. *Firſt*, Grantirg the true places of the *Luminaries*, with the *Moons Latitude*, either by *Calculation* or *Ephimerides*. *Secondly*, I find the right aſcention of the *Sun* in 8 *degrees* of *Aquarius* to be 310 *degrees*, added to 45 *degrees* or 3 *hours*, giveth 23 *hou.* 42 *min.* which ſheweth the 25 *degree* of *Piſces* to be on the *Meridian* or *Medium Cœli*; and the *Aſcendent* 28 *deg.* 28 *min.* of *Cancer*: and conſequently, the *Nonageſimo degree* falleth in 28 *deg.* 28 *min.* of *Aries*, being *Eaſt ward* of the *Meridian* 33 *deg.* 28 *min.* *Thirdly*, The *Declination* of the 25 *deg.* of *Piſces*, added to 57 *deg.* 10 *min.* giveth 59 *deg.* 9, *min*, the *Arch of the Meridian* between the 25 *degree* of *Piſces* and the *Zenith*. *Fourthly*, The Angle of the *Ecliptick* with the *Meridian*, being 66 *deg.* 33 *min.* giveth the *Arch* between the *Nonageſim* and the *Zenith*, by ſaying as *R*: Sine 59 *deg.* 9 *min* : : Sine 66 *deg.* 33 *min*: Sine of 51 *deg.* 48 *min.* *Fifthly*, Having the true

*Latitude*

*Latitude* of the *Moon*, with the *Parallax of Altitude*, and having found the *Parallactical Angle*, that is to say, the Angle made by the *Ecliptick*, and *Vertical* drawn through the *Center* of the *Moon* to be 52 *deg.* 11 *min.* *Sixthly*, The *Altitude* of the *Sun* being at 3 *hours* in the afternoon, in the *Latitude* of 57 *deg.* 10 *min.* is 5 *deg.* 41 *min.* These being premiſed, I deſire to know of *James Paterſon*, the *Parallax of Altitude*, *Longitud*, *right Aſcention*, *and Declination*: whereby we may know the tyme of the viſible *Conjunction*, the beginning of the *Eclipſe*, the middle, and end end; with the *Digits Eclipſed*: whither above or under the *Center* of the *Sun*. There are here required the reſolution of ſeverall *Triangles*, wherein, *ex tribus datis quartus requiritur*, either by *Calculation*, or *Projection*.

(Paterſon.) *Alſo he errs again in his* Tyde-Table *at* Lieth, *as if the* Moon *were not able to rule the* Tyde *here as at* Aberdeen.

(*Printer.*) As for the flowings at *Lieth*, which he carps at, they are not ſet down by my ſelf, as upon my own account, but in ſo far, as they have been approved of, by ancient *Seamen*, *Maſters* and *Coaſters*; aſſerting that at *Lieth*, a S. W. *by* S. Moon maketh at neareſt a full-Sea. This being a generall Obſervation, therefore doth admit of ſome particulars; as the Wind blowing at ſuch and ſuch an Art, cauſeth the flowings to varie, ſometymes an half point, and ſometymes more, in ſetting the flowings high, and other times low: yea, the *Seaſons* of the year, ſometimes doth alter and change the ſtreams, as about *Lambas*, the ſtreams then are higher, then at certain other tymes, and conſequently the generall Rule doth not hold altogether certain at all times; but doth ſometime varie. It is holden as a generall Rule by moſt of *Seamen*, that 3 quarters of an hour doth anſwere to a point of the Compaſs, the reaſon of this is, (as they ſay,) becauſe a quarter of the

*Horizon*, anſwereth to a quarter of the *Equinoctiall*, and conſequently, 8 *Points* to 6 *hours*: ſo that they would have the *Equinoctiall* equally divyded, as they do the *Points of the Compaſs*. I confeſs, into a *Parallell Sphear*, it will hold true, but not into an *Oblique Sphere*: As admit, in the *Latitude* of 56 *degrees*, S. W. *by* S. being 3 *Points*, or 33 *deg.* 45 *min.* or 2 *hou.* 15 *min.* I find in the *Equinoctiall* 29 *deg.* to which in time anſwereth to 1 *hou.* 56 *min.* of difference, being 19 *min.* in tyme. And this found out by a *Spherical* right Angled *Triangle*, by ſaying, as *R: S: Lat:: Tang. Arch* of the *Horizon*: *Tang.* of the *Equinoctiall Arch.* The neglect of this is an Error, although not admitted by many *Seamen*; but conſtantly aſſerting that 45 *min.* in tyme doth anſwere to a point of the *Compaſs*. *James Paterſon*, in his *Corrected Tyde-Table*, doth make *Lieth* to differ from other Tables, ſometimes a whole hour, ſometimes leſs; and in ſome agreeing, (to the great detriment and hazard of Ships ſeeking *Lieth Harbour.*) not determinating the true place of the *Moon*, which maketh a full Sea at *Lieth*; for if he ſhall have his recourſe to the *Theorie* of the *Moon*, except only the middle *Motion*, he ſhall involve himſelf into ſuch a Laborinth, out of which he ſhall never be able to extricate himſelf. Therefore by all that I have ſaid, I ſee no ground for his *Corrected Tyde-Table*: And no marvell, he not being bred a *Seaman*, neither educate in Letters or Learning, as I am informed, and yet calls himſelf, *Mathematicus*; O horrid Impudence! but being a while in *Ireland*, and having gotten ſome ſmatterings in the *Mathematicks*, cometh to *Edinburgh*, and layeth himſelf forth for *Mathematicus*: if it be otherviſe then is related, certainly he will ſhew himſelf in giving a ſolution to theſe five following *Problems*, not by *Aſſertion*, but by *Mathematicall Demonſtration*, I call them *Virginia Nautica.*

*PROBLEM*

## *PROBLEM I.*

There are two *Islands* in the parallell of 40 *degrees*, distant from each other 70 *Leagues*, a Ship sailing from the *Westermost Island*, between the *N*, and *E.* doth meet with a Ship that had sailed from the *Easternmost*, between the *N.* and *W.* and they are both in the *Latitude* of 41 *degrees* 30 *minuts*, and these two Ships have sailed 100 *Leagues*, I demand by what Courses these two Ships have sailed? and how many Leagues in every particular Course?

## *PROBLEM II.*

There are 3 *Islands*, A, B, C, the *Island* A, and B, in the parallell of 40 *degrees*, and are distant from each other 30 *Leagues*, the third *Island* C, distant from A, 45 *Leagues*, and bearing of A, *North-West*: a Ship steering her Course *East-South-East* from C, so long, till she cometh to the parallell of 40 *degrees*. I demand how far she hath sailed from the *Island* C, before she bring the two *Islands* A, and B, *sub maximo Angulo*, or greatest Angle?

## *PROBLEM III.*

A Ship in the *Latitude* of 40 *degrees*, is bound *West-ward*, and being at A, she setteth an *Island* B, bearing of her *South*, and keeping her Course *West*, being at C, she setteth the same *Island* bearing of her *South* by *East*, 5 *degrees Easterly*. Again, being at D, *South-South East* 4 *degrees Easterly*. Lastly, being at E, she setteth the same to bear of her *South-East* by *East* 6 *deg*, 15 *min. Easterly*: and hath sailed between D, and E, 2, 9 Leaug, more then between C, and D. I demand how far B was distant from A, when bearing *Southerly*.

## *PROBLEM IV.*

A Ship in the *Latitude* of 40 *degrees*, saileth so long between the *North* and *East*, till she altereth her *Longitude* 10 *degrees*, and hath departed from her first *Meridian*, 96 *Leagus*, 2 *Myles*: I demand how far she hath sailed? and by what Course?

*PROBLEM*

## *PROBLEM V.*

*Mr. Norwood*, in his application of *Sphericall Trigonometrie*, to the third kynd of ſailing, by the *Arch* of a great *Circle*, which is demonſtrated by him, and others, to be the beſt way of ſailing. (*Conſideratis Conſiderandis*) Therefore, ſuppoſing two *Places* or *Iſlands*, lying in the parallell of 60 *degrees*, diſtant from each other 20 *degrees* in *Longitude*; and there are two Ships, the one ſailing in the *parallel*, the other upon the *Arch* of a great *Circle*: I demand whither or no, he that ſaileth upon the *Arch* of a great *Circle*, doth make a *major*, or, *minor ratio*, to the great *Circle*, then he that ſaileth upon the *Arch* of the *Parallell*, doth to the *Parallell* in which he ſaileth?

In all theſe five *Problems*, I have given Letters Alphabeticall, by which any *Mathematician* may forme *Triangles* at pleaſure, *ſecundum data & requiſita*: And this much as to this purpoſe in the *Art Nauticall*; and ſo I proceed to another head.

(Paterſon.) *I have in the ſaid* Almanack *for the Year* 1683, *deſcribed an Inſtrument, called the* Lyne of Chords, *with a* Scale *of inch, and half inch, divyded in* 8 *equall parts, the former, ſerving for meaſuring of all right lyned* Angles, *the latter, for meaſuring the length, breadth, and thickneſs on Paper*; *and may ſerve for* Foots, Ells, Falls, Roods, Myles, *or* Leagues: *all which the* Printer *hath not in his* Prognoſtication.

(*Printer.*) I confeſs I have not the *Lyne of Chords*, or equall parts mentioned in my *Almanack*, wherein cannot a right lyned *Angle*, be meaſured by a line of *Sines*, or *Tangents*, as well as by a *lyne of Chords*? eſpecially by a line of *Sines*, ſeeing *Sines* are halfs of *Chords*; ſo that what is performed by the whole, may be performed by the half: *& contra*. As for your *lyne of Chords*, with your uſe ye make of them; if there be no more, a *Cabin-boy* can ſay als much

as

as you can ſay, without any detriment to the *Mathematicall-Science.* What do ye ſay, as not being acquaint (as, I ſuppoſe) with the *Orthographicall Projection*, wherein the Object, either *Sphere* or *Glob* is ſuppoſed to be projected *in plano*, at an infinite or indeterminate diſtance from the eye; from whence cometh or ariſeth *Ptolimie* his *Analemma*, wherein the *Soliſticiall Colure* being ſeen directly, is circularly projected. The other five, *to wit, the Horizon, Equinoctial,* and *Ecliptick;* with the hour of *Sex*, and *Prime Azimuth* of *Eaſt* and *Weſt*, being ſeen perpendicularly, are projected in ſtraight Lines: the Eye being in the interſection of all theſe Circles *in principio Arietis.* The other Circles that are ſeen *Obliquly*, are projected *Eliptically*, the parallels to theſe five mentioned are projected in ſtraight lyns, according to the nature of their *Primativs.* Theſe being premiſed the *Primatives* are divyded accordingly, by *Sines*, and ſo are contracted; the nearer they aproach the *Soliſticial Colure.* From hence I ſay, that all the *Problems* performed by *Ptolemie* his *Analemma*, may be performed by a *Lyne of Chords:* yea, all the *Problems* performed by the *Sines* in the *Seamans Callender*, may be performed by the *Lyne of Chords.* Laſtly, I ſay, that a *Lyne of Chords* of four inches *Radius*, will performe a *Problem*, either *Aſtronomicall* or *Geographicall*, better then a *Globe* of two foot *Radius.* And in ſo far, I have exalted your *Line of Chords*, in that wherein ye was deficient.

As for meaſuring right *Lyned Angles* by a *Lyne of Tangents*, I hold it a mere ready way, then by a *Lyne of Chords*; for in the one a *Compaſs* is requyred, for drawing an *Arch* from the *Angular Point*, but in the other, no *Compaſs* or *Arch* is requyred; ſave onely the *Radius*, and therefore, a *Tangent Lyne* is more uſefull then a *Lyne of Chords.* This *Tangent Lyne* is wonderfull uſefull in the *Steriographicall Projection*, which ſuppoſeth the *Object*, be it *Sphere* or *Glob*, contiguous with

with the Organ or Eye. But it may be ſaid, that *viſibile poſitum ſupra viſorum non facit viſionem.* I anſwere, it is true in *opacuous, thick,* and *dark Bodies,* but not in *Diaphanus* and *Tranſparent Objects.* This *Projection* is of greater uſe and concernment then the *Orthographicall,* becauſe in the *Orthographicall,* the diviſions of the *Radius* from the *Center,* doth ſhorten and become leſſer and leſſer towards the *Peripherie,* according to the nature of *Sines*: but in the *Steriographicall,* they increaſe from the *Center* towards the *Peripherie,* according to the nature of *Tangents*; ſo that the increment of the one, doth ſupply the decrement of the other: in this projection *Circles* directly or obliquely ſeen, are projected in *Circles,* but perpendicularly in *ſtraight Lines.* I could inlarge and delate my ſelf in this purpoſe, but fearing my enlargement ſhould ſeem tedious to the *Reader,* I ſhall at preſent produce ſome *Inſtruments,* framed by this *Projection,* and where the *Organ* is placed. And *firſt, Iohn Stophlerus* his *Aſtrolob,* where the *Organ* is placed at the Interſection of *Aries* and *Libra*; ſo that the aforenamed five great *Circles,* are projected in ſtraight Lines, and the reſt *Circularly. Iohn Blackgrave,* his *Mathematical Jewel,* yea, the *Univerſal Mapps* divyded into two *Hemiſpheres,* where *Meridians* and *Parallels,* are circularly projected; the *Equator* in a *ſtraight Line,* but the *Ecliptick* in a *Curve Line*: I admire to ſee the ſame, as having no ground for that projection; I pray you *Mathematicus,* let me know if there be any ground for the ſame? *nam cupio docere vel doceri.* I deſire to know of you, if a *Spherical Triangle,* ſuch as formerly I have deſcribed, if in the *Soliſtitial Colure* the ſame, or any other *Oblique Angled Spherical Triangle* be decircinated, peradventure without any terme given? if the quantity or meaſure of the ſides and Angles may be had? I doubt not, but as *Mathematicus* ye can performe the ſame; if otherwiſe, ſend to *Aberdeen,* and you ſhall have the ſolution

lution from me. And this much for the *Steriographical Projection*, the *Organ* placed at the interſection of *Aries* and *Libra*. The ſecond poſition, is at the *Poles* of the *Equinox*, and from thence ariſeth *Stoſler* his *Aſtrolob*; from whence *Mr. Gunters Quadrant* is taken: this *Aſtrolob* hath the *Equinoctiall* directly ſeen, with all the *Parallels*, the *Meridians Perpendicularly*, and are projected in ſtraight Lines; the reſt of the *Circles Obliquely*, and projected in *Circles*. The laſt is, when the *Organ* or *Eye*, is placed in the *Zenith* according to *Clavius* his *Aſtrolob*, or according to *Mr. Gunters Fundamentall Diagram* for plain dyaling; in which he doth project 10 great *Circles*, each of them having two *Surfaces*, except only the *Horizon*; ſo there doth ariſe 19 *Faces*, upon which plain *Dyalls* may be deſcribed, the *Horizon*, with all the Almicanters, are projected circularly from the primative, the *Azimuthes* in ſtraight Lines, the reſt Circularly; all which is performed Practically by *Mr Gunter* his laſt Edition: look *Gunter Lib*: 2. *Cap*: 3. *Sect*. 1. 2. 3. But if ye deſire a compleat Demonſtration of *Mr. Gunter* his *Practiſe*, conſult *Aguilonius* in the 6 book of his *Opticks*. I doubt not but what is ſaid, will put you to a *ſtudere*, but *ſtudiſſe* had been more proper for a *Mathematician*. There is another projection called *Scenographical*, keeping a middle between the former two, *in debita diſtantia*: but becauſe it conſiſts in ſhortning and lengthning of Objects, as they are diverſly ſeen, being more propper for *Painters* and *Limners* then for *Seamen*, to ſpeak further I deſiſt. Onely obſerve, that all *Spherical Trigonometrie* by calculation doth depend upon the projections: conſult *Theodoſius de Sphericis*.

As for your inch, and half inch, the one divyded into 16 equall parts, the other into eight; it had been better, and more like an *Artiſt*, to have divyded each of them *Diagonally* in 100 parts, both for *Navigation* and *Surveying*:

*ing*: for *Navigation* by dividing the *Meridian Line* according to *Mercator* his projection, according to degrees of increasing *Latitude*: and in *Surveying*, as afterward in the next shall be made manifest.

(Paterson.) *I have severall Measures, for* length, breadth *and* thickness, *beginning from* Barley Corn *in reference to an* inch, *from thence to* 12 inches *making a* foot, *and* 5 foot *to a* pace, *and* 1000 paces *to a* myle, *and so forward; as you may see into my* Almanack, *all which ye have not at all expressed into your* Almanack.

(*Printer.*) I do confess, I have not expressed any *Measures* into my *Almanack*, neither is it requyred I should do so, being different because of their Objects: for the *Almanak* is in reference to *Celestiall* things, and the other to *Terrestriall*. But let us proceed to the purpose, wherein he sayeth 5 *foot* make h a *pace*, and therefore I desire to know of him, if *paces* in all *Nations* and *Countries* be equal, or unequal; equal (I say) they cannot be, because the *foots* in diverse *Nations* are unequall; for the longer the *foot* be, or shorter; the fewer or more *foots* goeth to a *pace*: and therefore the *paces* are unequal, and if *paces*, then *myles*; and if *myles*, then no certainrie can be had for the measure of a *degree* upon the Arch of a great *Circle*; which is absurd, and not consistent with reason. But now, let us come to find the method and way, how the Ancient and Modern *Geographers*, did find out certain measures upon *earth*, in reference to the *Heavens*. I will begin first, with the *Egyptian Geographers*, as *Eratosthenes*, who lived 276 Years before CHRIST; and *Ptolomie* who lived 140 Year after CHRIST: They having chosen two places lying under or near the same *Meridian*, differing onely in observation, at 2 or 3 *degrees* in *Latitude*, which afterwards by a customary and standerd Measure of that Kingdome of *Egypt*, they did find five *foot* to go to a *pace*, and

and 1000 *paces* to a *myle*. But the Learned *Mr. Norwood* did of late into his Book, called the *Seamans Practice*, following the Ancient *Geographers*, in their practice, in measuring between *York* and *London*, find a *degree* upon the *Meridian*, to contain 367200 *foot Engliſh*; and a *myle* 6120, ſo that an *Ægyptian pace* containeth 6, 15 *Engliſh*, and an *Ægyptian foot* 14, 75 *Engliſh inches* at nearest. But paſſing the fraction we take *in numero rotundo*, 6 *foot* to the *Engliſh pace*, and conſequently, 6000 *foot* to a *myle* in *Engliſh* meaſure. Now let us compare *Scots* with *Engliſh*, and firſt, ye ſay that 37 *Engliſh inches* according to your ſtanderd at *Edinburgh* giveth an *Ell*; Then a *Fall*, or *Pole* being 6 *Ell*, giveth 222 *Inches*, 222 by 4, the length of a *Chain*, the product is 888: which being multiplyed by 80, giveth 71040: and divyded by 12, the quotient is 5920 *Foots* ſhort of 6000, by 80 *Foot*. Again, 42 *Scots Inches* in an *Ell*, as of the old ſtanderd, that is, 3 *Foot* and a half; the *Pole* or *Fall* being 21 *Foot*, the *Chain* 84 *Foot*, multiplied by 80, giveth 6720 *Foot*, for the lengrh of a *Scots Myle*; which being reduced to an *Engliſh Myle*, ſay as 10: 9:: 6720: 6048 *Engliſh*, ſo that here the difference is onely 48 *Foot*, whereby the *Scots Myle* exceeds the *Engliſh*: and no wonder, becauſe 6000 doth admit a Fraction, which will be near equivalent to 48 *Foot*: and therefore, *Mr Norwood's Practiſe* doth altogether agree with a *Scots Myle*. But it may be ſaid, or inquyred of me, the reaſon why I ſay, as 10: 9:: 6720: 6048. I anſwere, becauſe if an *Engliſh Inch* be divyded in 10 parts, 9 of theſe doth anſwere to a *Scots Inch*: Therefore, being to reduce *Engliſh* to *Scots* meaſure, ſay as 9: 10; but *Scots* to *Engliſh*, ſay as 10: 9. Theſe being premiſed, I would advyſe *Surveyers* here, as in *England*, to divide their 4 *Pole Chain* into a 100 parts, which we call *Links*; and there will anſwere 10 *Inch* to a *Link*, this *Chain*

ſo divyded, is very profitable for Surveying of Grounds, or Plating; and giving the *Area*, as ye ſay, 4 *Pole* in *Latitude*, and 10 in *Longitude*, giveth 160 *ſquare Poles* for the *Area*: ſo alſo 1 *Chain* or 100 *Links* in breadth, multiplied by 10 *Chains* or 1000 *Links* in length, giveth for the *Area* 10 *ſquare Chains*, or 100000 *ſquare Links*; 75000 *Links*, 3 Rood, 50000 *Links*, 2 Rood; 25000 *Links*, 1 Rood: or 40 *Pole*, 625 *Links ſquare* for a *Pole*. This I have premiſed for the benefit of *Surveyers*, they making uſe of the *Diagonall-Scale*, of *Inch*, and *half Inch*, or of any other Meaſure, *Diagonally* divided.

(Paterſon.) *Alſo in my* Advertiſement, *being the laſt in my* Almanack, *ſuch as deſire* Mathematicall-Arts *or* Inſtruments *thereto belonging, eſpecially a* Spirall-Lyne, *which I have ſo framed, that you may work more* Arithmetick *in one houre, then any other in two dayes with the pen.*

(*Printer.*) Ye ſay ye have framed a *Spiral-Line*, ſo as the ſame had never been framed before; I had a true relation, from one that was a teacher of *Mathematicks* at *London* 40 yeare agoe, who told me, that one *Mr. Brown* a *Carpenter*, who lived at *London*, in the *Minaries*, near *Tower-hill*, was the firſt that did frame 3 *Spiral-Lines* upon a *Circular Inſtrument*, for *Artificial-Numbers*, *Sines* and *Tangents*; having two *Braſs Indices* or *Legs*, fixed upon the *Center*, and opening in manner of a *Sector*, ſo that, when 3 Terms were given to find a fourth, the one Leg was placed to the firſt Terme, and the other to the ſecond; then turning the Legs upon the *Center*, (not being altered or changed) the firſt to the third Terme, the ſecond ſhall give the fourth requyred: whither the work be in *Trigonometrie*, *Plain*, or *Spherical*; or in *Arithmetick* ſimply. This *Inſtrument* can be had at *London*, being more ſerviceable then his, which is only for *Arithmetick*. He ſayeth, that by this *Inſtrument*, they may work more *Arithmetick*

in

in one houre, then any other in two days with the Pen But I ſay, (in *Arithmetical-Problems*,) with the Pen ſhall work more in one hour, then he and his *Spiral Line* ſhall do in 10 dayes. MART.

*Carpere vel noli noſtra, vel ede tua.*

## A POSTSCRIPT

### By way of *Epiſtle* to the *Candid-Reader.*

*Courteous Reader,*

IT was an excellent Saying of CICERO, *All the Praiſe of inward Vertue, conſiſteth in the Good of outward Actions.* Therefore, not only is it my Genious, but earneſt deſire to ſerve my *Countrey*, into every thing moſt uſefull and neceſſary for the Good thereof: eſpecially, into that Noble and Famous Art of *Navigation*, without which, all *Trade* and *Commerce* in every Kingdom, ſhould quite languiſh and decay. I have therefore, in this ſmall *Treatiſe*, explained the three ſeverall *Motions of the Moon*, (viz.) her ſlow Motion, her middle Motion, and her ſwift Motion; together with *Tables* for her true riſing and ſetting: alſo, ſhewing her Motion, in *Signs*, *Degrees* and *Minuts*, for every day of her Age: with *Everlaſting Tyde-Tables* for

for the *Ebbs* and *Flowings* of the *Sea*, according to the Points of the *Compaſs*, and the *Moons* daily Age; (with the *Hours* and *Minuts*) not only for the *Coaſt of Scotland*, which was never yet ſo fully mentioned by any; but alſo, for all other places in the World. And having reviſed and compared the beſt *Authors*, who mention theſe *Flowings*, and finding the moſt part of them differing from each other in the ſame; have therefore by advyce of judicious *Sea-men*, made uſe of the beſt, and ſureſt of them: Nevertheleſs, I humbly intreat any of our Experienced, Induſtrious, and moſt Laborious *Sea-men*, who have Navigated theſe places, that they will be pleaſed to help any ſmall overſights, (if there be any,) and ſend me information thereof by a Line, and accordingly I ſhall be moſt carefull to amend the ſame in the next *Impreſſion*: being moſt willing to extend my ſelf for the Advancement of that *Noble Art*, intending (if this *Impreſſion* go well off for my Encouragement, and be well taken,) to publiſh another Excellent peece of *Navigation* very ſhortly. Laſtly, You have here a *Mathematicall Dialogue*, betwixt *James Paterſon* pretended *Mathematician* at *Edinburgh*, and Me, *John Forbes Printer to the City, and Kings Univerſity of Aberdeen*: in which *Dialogue*, I have converted *Vulgar Fractions* into *Decimalls*, and therefore any intelligent Perſon may reap ſome knowledge, and I hope, be well pleaſed with the ſame.

For,

For, without any juſt Ground, or Provocation given, *Iames Paterſon* did moſt ignorantly Rhyme againſt me, into his *Almanack*, for the year 1683, and likewiſe into his *Almanack* for the year 1684: making a great noiſe, concerning the miſtake of two dayes for *Hallow-Even*, altho *Hallow-Day* was exactly right, both for the day of the *Week*, and day of the *Moneth*: for all the World knoweth, *Hallow Even* to fall upon the night before *Hallow-Day*. But his *Errors* are more groſs, making the *Flood of Noah* in his *Chronologie*, in all his *Almanacks* three hundred years ſhort: A very beaſtly *Error*, beſides other groſs *Errors*, which I forbear at this occaſion, any more to mention. For, as the good old Saying is, *Envy ſhooteth at others, and woundeth her ſelf.* Truely I am heartily ſorry, that both *Mathematician* and *Printers* are ſo evil Principled in the Grounds of Chriſtianity, as holy *Ambroſe* ſayeth, *Envy is nothing elſe, but a Grief of the Mynd, at other Mens Proſperitie.* And for my own part, I do declare it to the whole World, I hate ſuch unrighteous and baſe Practiſes. For *Agnes Campbel* Spouſe to *Patrick Telfer*, hath cauſed Counterfit and Re-print my *Almanacks* into her Printing-houſe theſe ſeverall years bygone, ſometimes Entituling them by *Aberdeens Almanack*, and other times, according to *Forbeſſes Almanack*, beſides ſhe hath for the enſuing year 1684, cauſed Print an *Almanack* as it were ſet fourth at *Aberdeen*,

and

and Printed in *Aberdeen*, which is a moſt notorious untrueth: impudently affixing thereto, ſome Lynes in the End, of *Dogrell Rhyme*, whereby ſhe would have me to Patroniſe her baſe Execrations; as tho I, (contrary to Chriſtianity and the good Conduct of Nature,) ſhould wiſh any man for any cauſe to hang himſelf. For, I ſeriouſly declare, tho I be but one of the meaneſt of his MAIESTIES Subjects: yet, I not only heartily pray for his long Life, and good Health; which I hold more to be my Duty, then to drink: but alſo, I have ſo much preſumption, as to ſtrive to follow my GRACIOUS SOVERAIGN in this matter, who by his numerous Acts of *Clemency*, hath (indeed) ſufficiently declared to all the World, that he exactly followeth *his Great* LORD *and* MASTER in this, that *he wiſheth not the Death or Ruin of his Subjects; but rather that they would Repent and Live.* For as *Horace* ſaid well, *Subjects follow the Example of their Princes, as certain Flowres turne according to the Sun.*

*Almighty GOD, preſerve Our Gracious KING,*
*And's Subjects Hearts to due Obedience bring.*

And as for *Robert Sanders*, *Printer in Glaſgow*, he hath not onely inſerted a notorious Untrueth into all his *Almanacks* theſe diverſe years bygone, (ſaying ſet forth at *Aberdeen*, as if the Famous Colledge of *Glaſgow* had not ſo much *Mathematicks*, as to ſet forth an yearly *Almanack*; which in him, was

was no great Act of Prudence,) but alſo, contrare to the Good and Iuſt Lawes of this *Ancient Kingdom*, he hath cauſed Counterfit the *City of Aberdeen's Armes*, and affixed them upon his moſt Erronious, and Uncorrected *Almanack*, for the year 1684: whereof I am aſhamed to ſpeak, that ſuch an *Almanack* ſhould be publiſhed in this *Kingdom*; as may be ſeen into the *Termly Quarters* and *Aſpects*, *&c.* tending much to the Diſcredit of that Famous City of *Glaſgow*: not deſerving to be called their Printer, *Conſideratis*, *Conſiderandis*. All which unrighteous Practiſes, proceedeth more from Envy then ſound Chriſtianity; according to the good old Saying, *The Envyous man thinketh his Neighbours loſſes to be his Gaines.* And as the *Apoſtle* ſayeth, *Titus* 1. 15. *Unto the Pure all things are pure, but unto them that are defiled and unbeleeving is nothing pure; but even their very Minde and Conſcience is defyled.* And as for their Lying which is ſuch a gröſs Sin, that the Holy Spirit of GOD, in the Scriptures doth very often expreſly prohibet, as *Rev.* 21. 27. *Rev.* 22 15 and very many other places in Scripture. Yea, *King David* himſelf ſayeth *Pſalm* 63. 11. *The mouth of them that ſpeak Lie ſhall be ſtopped*, *&c.* I might very largely inſiſt upon this, only I ſhall deſire the Guilty to be more ſtudious, and ſerious with the Holy Scriptures of GOD, which is the Rule of our Life. For, the very *Heathen Egyptians*, *they made a Law, that ever*

*Lyer ſhould be put to Death.* And *Xenophon* ſayeth, *that a Lye is not capable of Pardon.*

*Courteous Reader*, having Patiently born with all theſe Injuries and Wrongs done unto me, for a long time, I could not (having this Opportunity) but clear my ſelf, in giving you a view thereof, for which I humbly crave your Charitable Cenſure. For, as *Auguſtin* ſayeth, *Patience being often provocked with Injuries, breaketh forth at laſt into Furie.* I ſhall not (at preſent) Enlarge any farder, but (as I did begin with my Antagoniſt *James Paterſon*, who was the Principall Occaſioner of this Diſcourſe) ſhut up all with that good Saying of *Auguſtin*, *Amongſt the Fooliſh he is the greateſt Fool, that knoweth little, and yet would ſeem to know much.* And therefore I Conclude thus:

James Paterſon, *your Wiſdom is not great,*
*As may be ſeen into your Works of late;*
*For though you ſay that I do* Art diſgrace,
*Not knowing where I do my* Errors place;
*Yet ſure I am, they ſhould have a* Clean-Pow,
*Who alwayes call their Neighbour* Nittie-Now.
*For all the Errors you put to my Doore*
*Are leſs then yours, even by an hundred ſcore.*
*Your* Hallow Even, *and your* Corrected Table,
*Are but two frolicks, coming from a Bable.*
*As for your* Eclipſes *and* Moon's-Aſpects,
*You are aſham'd thereof in all reſpects.*
*Here's nothing then, whereof I ſhall think ſhame,*
*Ever to publiſh in my Countries Name.*

*But*

*But notice* Sir, *Here is a pretty* Jeſt;
*That* Vulgar *ſtill eſteems our Works the beſt*;
*As you confeſs, into your* Almanack
*For Eighty-foure, which is a pretty* Knack.
*It being holden for a reall trueth,*
*When men confeſs the ſame with their own Mouth.*
*Yea, fy upon it. You ſhould* Art *diſgrace!*
*And wrong* GOD'S Word *with ſuch a braſen face;*
*Making* GOD'S Works *three hundred Years to ſleep,*
*Since* Noah's-Ark *did float upon the* Deep.
*Which beaſtly* Error, *I ſhall make appear,*
*From* Almanacks *you have made Year by Year.*
*Now if this be the beſt part of your Pratticks;*
*Which do proceed from* Iriſh-Mathematicks:
SCOTLAND *will then have no more of the ſame,*
*But keep themſelves by* BON-ACCORD'S *Good Name:*
*Who ſtill ſhall have the Praiſe what e're befall,*
*Becauſe your* Errors *are ſo groſs, in all.*
*Your* Spirall-Line, *and eke your* Line of Chords,
*Both of them little Wit, or Skill affords.*
*Such learned* Subjects, *and ſuch ſtately* Knacks,
*Are moſt unfit for* Yearly Almanacks.
*Whoſe* Matter *ſtill ſhould be for* Vulgar uſe,
*Neglecting which, you do your ſelf abuſe*
*Now if you will* Rhyme *more in the next Year,*
*My* Anſweres *then ſhall be apparent clear.*
*Your* Almanacks *by Mine, I pray to mend,*
*I'le ſay no more, I thinke it tyme to end.*

FINIS quod *FORBES.*

GOD SAVE THE KING.